UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,936	10/11/2005	Bert Braune	502902-210PUS	6897

27799 7590 01/28/2009

COHEN, PONTANI, LIEBERMAN & PAVANE LLP
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

EXAMINER
FAROKHROOZ, FATIMA N

ART UNIT	PAPER NUMBER
2889	

MAIL DATE	DELIVERY MODE
01/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/552,936	BRAUNE ET AL.	
	Examiner	Art Unit	
	FATIMA N. FAROKHROOZ	2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7,9,11,12,14 and 15* is/are pending in the application.

4a) Of the above claim(s) *14 and 15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,9,11 and 12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The Amendment, filed on 10/30/08 has been entered and acknowledged by the Examiner.

Cancellation of claims 6,8,10, 13, 16-21 and withdrawal of claims 14-15 has been entered.

Claims 1-5, 7, 9, 11, 12, 14-15 are pending in the instant application.

The declaration filed by the inventor has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taskar et al (US 6734465) further in view of Tasaki (US 20020030292).

Regarding claim 1, Taskar teaches a luminescence-conversion LED (Fig.1;col.6,lines 62-65; col.1,lines 13-16), comprising: an LED chip (col.1;lines 12-16 and 37-41) emitting primary radiation with a peak wavelength in the range of 300 to 470 nm (col.1,line 37-39; col.5,lines 32-44; claims 4 and 24 ; also see col.4,lines 55-65 wherein absorption is in the 370-470 nm range and col.5,lines 20-55; wherein **down**

conversion is disclosed which is the secondary **longer-wave radiation**), the primary radiation being converted partly or completely into secondary longer- wave radiation (see col.1,line 37-39 wherein the blue LED energizes the yellow phosphor which is of longer wavelength;col.2,lines 8-14) by photoluminescence by at least one phosphor (blue phosphor in (col.1;lines 37-41) which is exposed to the primary radiation of the LED, wherein the at least one phosphor is a nanophosphor having a mean particle size d50 that lies in the range of 1 to 50 nm (lines 43-45 of col.3; lines 23-25 of col.7 and claim 3 of Taskar) and wherein the nanophosphor is a garnet A3B5012 which is doped with a rare earth element D (see nano-YAG:Ce in Claim 13 of Taskar and col.4,lines 55-60; also see col.1,lines 37-39;col.10;lines 50-62).

Taskar further teaches that the absorption depends on the activator (col.5, lines 48-50; col.5, lines 32-36) and on the impurity in the nanostructure (col.4, lines 45-48).

Tasker does not explicitly teach the proportion D being at most 0.9 mol % of a component A of the garnet A3B5012.

In the same field of endeavor of garnet phosphors in light emitting devices, the added Tasaki reference teaches a A3B5012 garnet comprising YAG doped with cerium wherein it is disclosed that a composition of 1.23 wt% of Ce ([0102]; [0110];[0120];[0123];[0125]) and also 0.1 to 10 mol % of Ce additive (see Additives to be added to the fluophors include, for example, cerium ….. Cerium is most preferable among these. An amount of additive is preferably in a range of 0.1 to 10 mol % to the fluophor in [0057] and [0058]) in order to optimize the luminescence conversion.

Further, regarding the specific proportion of D being at most 0.9% of a component of A of the garnet A3B5012; since Tasaki already teaches a mol.% of 01. to 10 mol.% of Ce additive in conventional A3B5012 phosphors to choose a 0.9 mol.% for the dopant in nanophosphors, absent any criticality, is only considered to be the " optimum " value, that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy and discovering an optimum value of a result effective variable involves only routine skill in the art in order to optimize the luminescence conversion.

Regarding claim 2, Taskar teaches a luminescence-conversion LED, wherein the at least one phosphor is dispersed in an encapsulating compound which is exposed to the primary radiation, the encapsulating compound comprising insulating material (lines 65-68 of col.6 to lines 1-6 of col.7 wherein suitable insulating matrix materials are listed).

Regarding claim 3, Taskar teaches a luminescence-conversion LED, wherein a blue emitting primary radiation of a peak wavelength of 420 to 470 nm is used (Col.1,lines 35-40;col.2;lines 8-15;col.4,lines 55-65;also see rejection in claim 1), together with a secondary yellow emitting phosphor (col.5,lines 37-42;col.1;lines 49-51;col.2,lines 57-59;col.3,lines 31-33).

Regarding claim 4, Taskar teaches a luminescence-conversion LED, wherein a

UV (col.3,lines 30-35;col.5,lines 45-48) emitting primary radiation of a peak wavelength of 330 to 410 nm is used (see rejections in claims 1 and 3), together with three secondary red, green and blue emitting phosphors (col.1;lines 57-60;col.3;lines 30-34;claim 21).

Regarding claim 7, Taskar teaches an luminescence -conversion LED (Fig.1), comprising: an LED chip emitting primary radiation with a peak wavelength in the range of 330 nm to 470 nm, the primary radiation being converted partly or completely into secondary longer-wave radiation by photoluminescence by at least one phosphor which is exposed to the primary radiation, the at least one phosphor being a nanophosphor having a mean particle size d50 that lies in the range of 1 to 50 nm (see rejection in claim 1 above). Further Taskar teaches that the nanophosphor is made to luminesce by an activator (col.4, lines 20-28; col.10, lines 50-62)

Taskar does not explicitly teach that the nanophosphor has an absorption in the range of the peak wavelength of the primary radiation of less than 50%, and wherein the nanophosphor has a reflection of greater than 50%.

However, Taskar teaches that the absorption depends on the activator (col.5, lines 48-50; col.5, lines 32-36) and on the impurity in the nanostructure (col.4,lines 45-48). Further, depending on the variation of the absorption, the reflection also gets varied.

Therefore, regarding the absorption and the reflection ranges: since Taskar discloses that the absorption depends on known factors as described above, but does

not disclose a particular range for these parameters; it would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide an absorption greater than 50% and a reflection of less than 50%, since where the general conditions of a claim are disclosed in the prior art, discovering the "optimum range" involves only routine skill in the art.

Regarding claim 9, Taskar teaches a luminescence -conversion LED (Fig.1) wherein the nanophosphor includes an activator.

Taskar does not teach an LED, wherein the concentration of the activator is at most 75%, of the concentration of the activator included in an identical micrometer-phosphor so that the given activator concentration of the micro-meter-phosphor-is higher and serves as a reference corresponding to 100%, the micrometer-phosphor being chosen such that it has a high absorption of more than 50% in the range of the peak wavelength of the primary radiation but an identical phosphor with low concentration of the activator has low absorption of at most 30% in the range of the peak wavelength of the primary radiation.

However, Taskar further teaches that the absorption depends on the activator (col.5, lines 48-50 and 32-36) and on the impurity in the nanostructure (col.4,lines 15-25; lines 45-55). Tasker further discloses that the **absorption efficiency of 80-90%** can be achieved by the nanoparticles.

Hence; with respect to the specific concentrations of the activator and the absorption regions: the applied Prior Art Taskar has disclosed the LED dependencies

on the light generated and on the activator. The specific activator concentrations and the absorption claimed by applicant, absent any criticality, is only considered to be the "optimum" values based on the theory disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, and since neither non- obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as various activator concentration values are experimented as suggested by the Prior Art. In this case, varying the activator concentration will be obvious for one having ordinary skill in the art who want to modify the absorption depending on the peak wavelength of the primary radiation.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taskar et al (US 6734465) and Tasaki (US 20020030292) as applied to claims 1-4,7 and 9 above, further in view of Fink (US PG pub. 20030057821).

Regarding claim 5, Taskar teaches the invention set forth above (see rejections in claims 1 and 4). Taskar does not disclose an LED, further comprising a phosphor system comprising: Y202S: Eu for red; ZnS: Cu, AI or ZnS: Cu, Mn or ZnS: Cu for green; and SCAP or ZnS:Ag for blue.

In the same field of endeavor of display devices, the added Fink reference teaches a light emitting device wherein the following phosphor system is used: Y202S:

Eu for red; ZnS: Cu, Al for green; and ZnS: Ag for blue ([0005], lines 1-5) in order to make them vacuum compatible for many applications ([0004]).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the phosphor system as disclosed by Fink, in the LED of the Taskar in order to make them vacuum compatible for many applications

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taskar et al (US 6734465) and Tasaki (US 20020030292) as applied to claims 1-4,7 and 9 above; further in view of Burroughes (US PG pub. 20030076454).

Regarding claim 11, Taskar teaches an LED (see rejection of claim 1). Taskar does not teach that the chip is connected to a voltage source via electrically conductive terminals.

In the same field of endeavor, Burroughes implicitly teaches a light emitting device (Fig.1) wherein the chip is connected to a voltage source ([0030],[0033]; Table 1, Table 2) via electrically conductive terminals for the benefit of operating the device at low voltage, so that lower power is consumed.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to use a voltage source as disclosed by Burroughes, in the LED of Taskar for the benefit of operating the device at lower voltage, so that lower power is consumed.

Regarding claim 12, Burroughes teaches a light emitting device connected to a voltage source wherein the voltage source provides a voltage of at most 5 V ([0030]; [0033]).

Response to Arguments

Applicant's arguments filed on 10/30/08 and the declaration filed by the inventor has been entered.

Through out the Remarks, the Applicant has argued that

1) the garnet A3B5012 in the prior art Doxsee is not YAG that is being claimed since it is TAG.

The argument is not persuasive because in the previous claim 13 and the present amended claim 1, the garnet A3B5012 that has been recited in the claims were **properly** rejected by Doxsee **since Doxsee explicitly taught A3B5012 garnet which was the claim limitation of the previous claim 13.**

2) Further, the Applicant argues in the Remarks as well as provides a declaration from the inventor about the criticality of the mol. % of Ce in the previous claim 13 which is now a limitation within the amended claim 1.

In response to arguments 1) and 2) above, the Examiner has provided a new prior art Tasaki that not only discloses YAG:Ce garnet but also the mol% of 01. to 10 mol % of Ce for conventional phosphors. Further, regarding the specific proportion of D being at most 0.9% of a component of A of the garnet A3B5012; since Tasaki already teaches a mol.% of 01. to 10 mol.% of Ce additive in conventional A3B5012 phosphors

to choose a 0.9 mol.% for the dopant in nanophosphors, absent any criticality, is only considered to be the " optimum " value in order to optimize the luminescence conversion, that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy and discovering an optimum value of a result effective variable involves only routine skill in the art.

Therefore the claims are not in condition for allowance.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 20040178417 teaches YAG:Ce used for luminescence conversion.

US 3689415 teaches an A3B012 as a garnet with Yttrium and Al.

US 6241819 teaches the absorption vs wavelength and the intensity vs wavelength dependences for quantum size phosphors.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fatima Farokhrooz whose telephone number is (571)-272-6043. The examiner can normally be reached on Monday- Friday, 9 am - 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh-Toan Ton can be reached on (571) 272-2303. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Fatima N Farokhrooz/
Examiner, Art Unit 2889

/Joseph L. Williams/
Primary Examiner, Art Unit 2889